

An overview Compressed Natural Gas for Fleets

June, 2019

Safety Minute: Two Numbers



**Know what's below.
Call before you dig.**



Presentation Agenda

- **Overview of Chesapeake Utilities**
- **Benefits of Natural Gas**
- **Why is a Natural Gas Utility at a Freight Summit?**
- **What is CNG?**
- **Can CNG give Delaware Fleets a Competitive Edge?**

1859: Dover Gas Light Company, Dover, DE



LOCKERMAN STREET FROM POSTOFFICE—DOVER, DELAWARE.

Energy Lane Campus - Dover, DE

56,000sf of office space
33,000sf of warehouse space
CNG Vehicle Fueling Station
20.6 acres

Chesapeake Utilities &
Eastern Shore Natural Gas

Golden Globes Certified
by the Green Building Initiative



Corporation (NYSE:CPK) and Business Units

Corporate Logo



Business Unit Logos



Operational Presence

Delaware and Maryland

Natural Gas Transmission,
Distribution and Marketing
Propane Distribution

Virginia

Propane Distribution

Pennsylvania

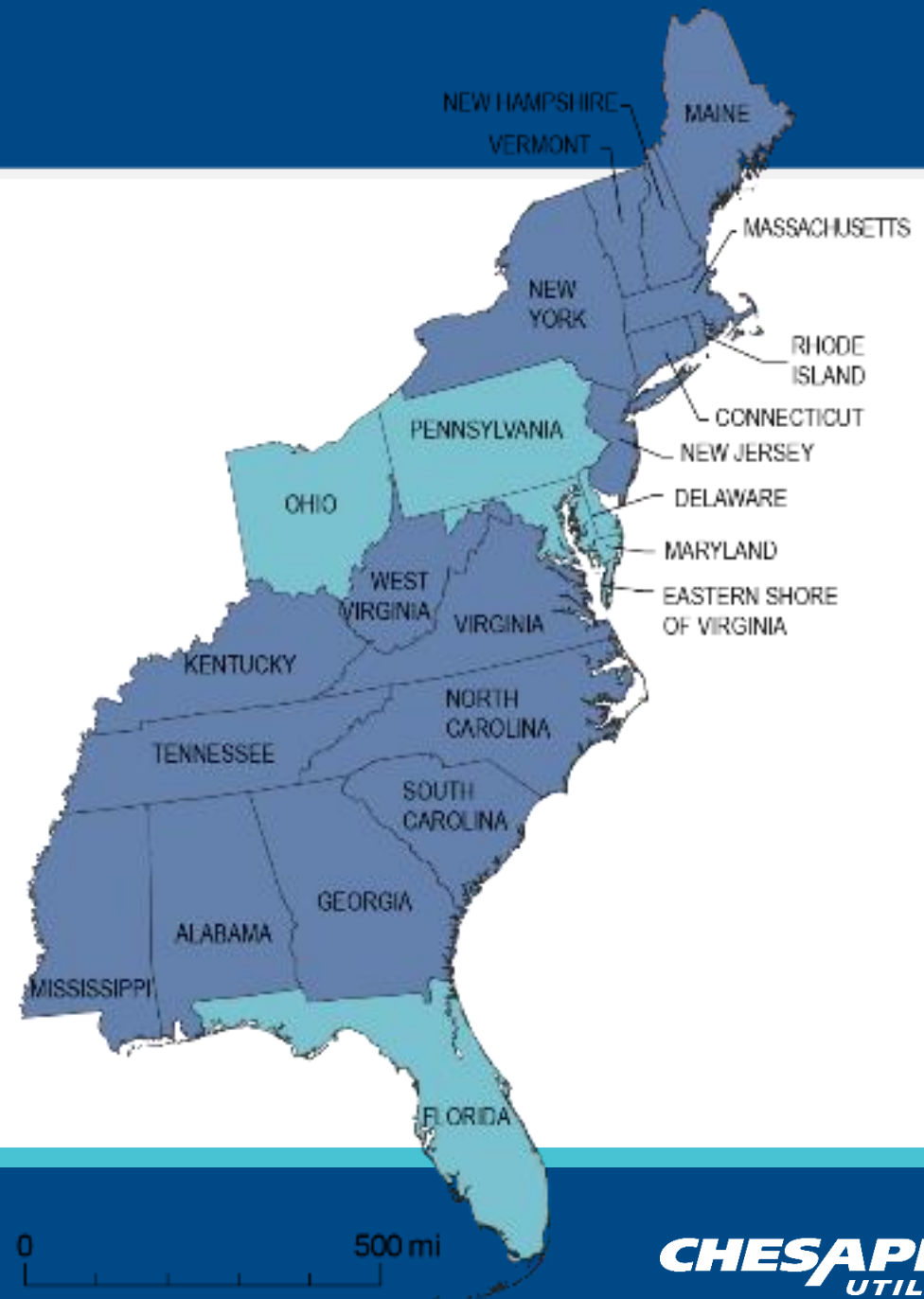
Natural Gas Transmission
Propane Distribution

Florida

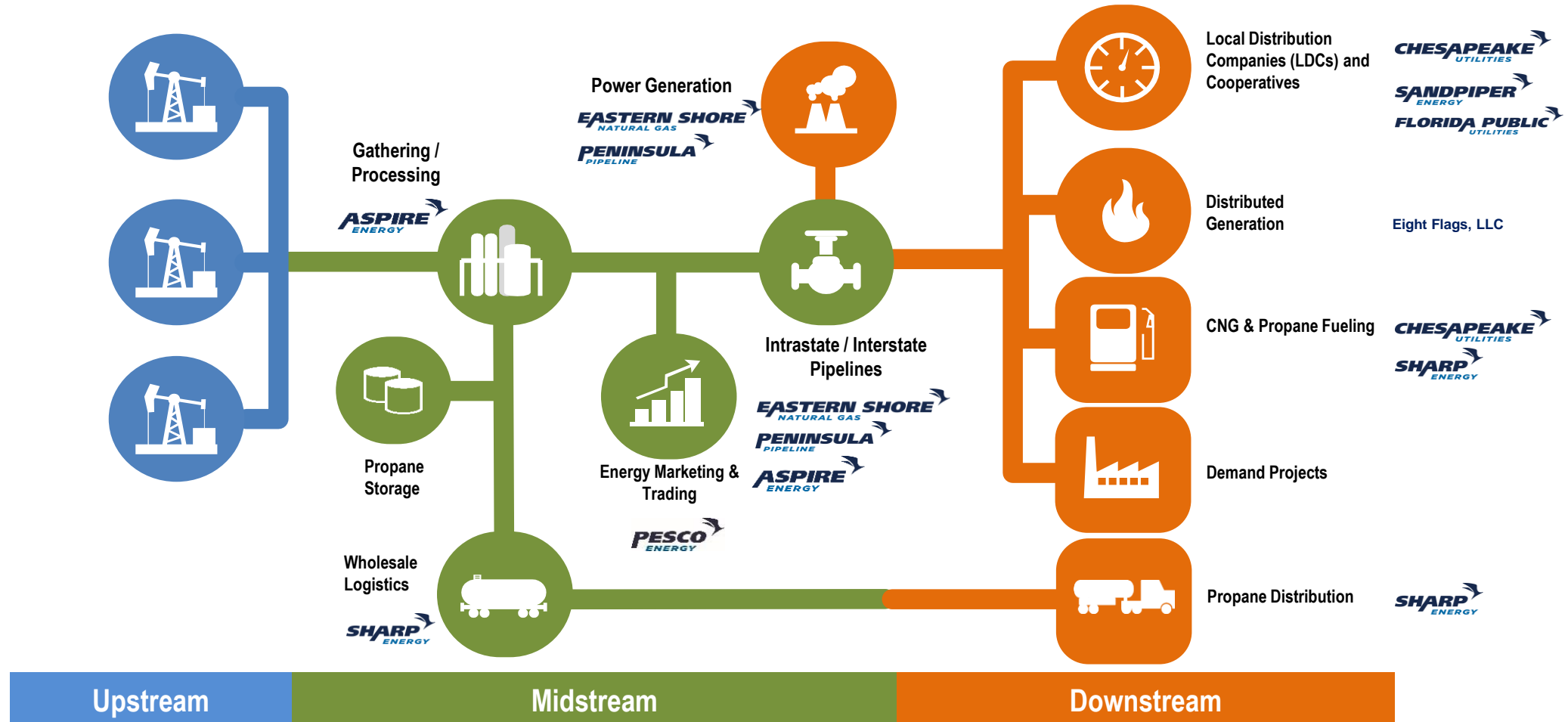
Natural Gas Transmission, Distribution and Marketing,
Electricity Distribution, Combined Heat & Power Plant
Propane Distribution

Ohio

Natural Gas Gathering, Marketing,
Liquids Processing and Distribution



The Energy Value Chain



Chesapeake Utilities Service Territory

Regulated Local Distribution Company (LDC)

80,000+ residential, commercial and industrial natural gas customers in Delaware and Maryland's Eastern Shore

Includes approximately 11,000 customers served by subsidiary Sandpiper Energy in Worcester County, MD



C&I Natural Gas Customers



Benefits of Natural Gas



CLEAN

Direct use of natural gas can cut carbon emissions nearly in half when natural gas is consumed directly for heating and cooling, water heating and other applications.

DOMESTIC

About 98% of the natural gas used in North America comes from North America, helping to make the U.S. more energy independent and less vulnerable to volatile oil pricing.



ABUNDANT

The current domestic natural gas base is large enough to meet current U.S. energy needs for more than 100 years.



SAFE

According to the National Transportation Safety Board, natural gas pipelines are the safest form of energy transportation - safer than truck or rail. The commitment to safety can be seen through the industry's \$22 billion a year investment in safety programs.



EFFICIENT

92% of the natural gas delivered to customers is usable energy, compared to electric end-use products which maintain only 32% usable energy.



PREFERRED

Across the U.S., natural gas is used in roughly 68 million homes, 5.4 million commercial and public buildings including schools and hospitals, and 192,000 factories.

Natural Gas Facts

Approaches 100% reliability

Safest form of energy transportation

Used in roughly 5.4 million commercial and public buildings including schools and hospitals, and 192,000 factories in the U.S.



In 2016, natural gas accounted for more than 33% of electricity generation in the U.S.

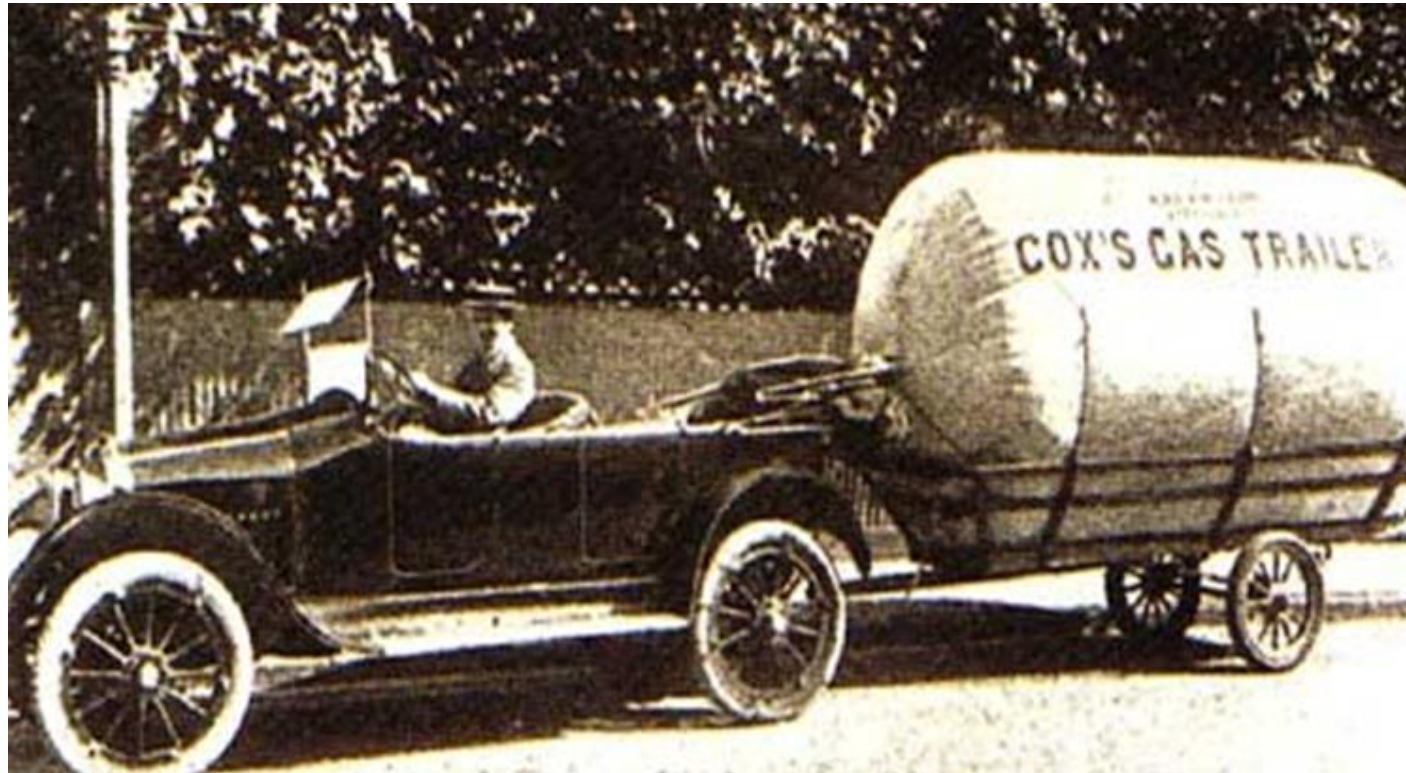
When natural gas is used directly, it can achieve up to 92% energy efficiency

Natural gas emits up to 56% fewer greenhouse gases than coal for the same amount of electricity

98% of natural gas used in this country is domestically produced

“Enhanced usage of natural gas is the single most effective way for the world to reduce emissions responsibly.” (igu.org)

What is CNG?



CNG = Compressed Natural Gas

- Natural Gas for all classes of vehicles.
- Compressed to less than 1% of its original volume and stored at 3,600 psi.
- Time-tested. Used as a vehicle fuel for over 60 years.
- An abundant, domestic, clean alternative to petroleum.
- Powers more than 15 million vehicles worldwide, and about 200,000 in the US.
- Global CNG growth rate is 30%; In the US it's about 4% since 2000.

CNG is Safe



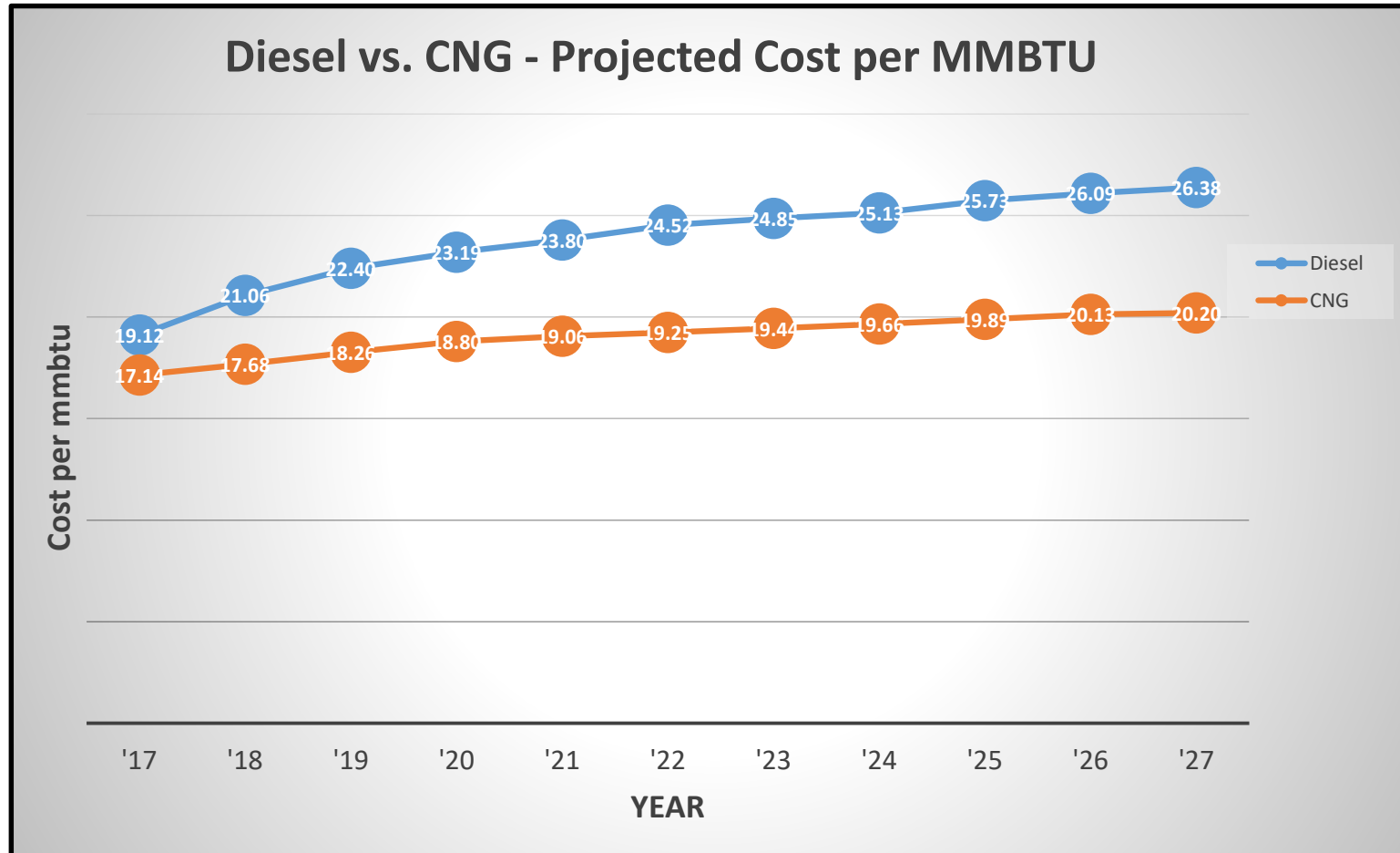
- CNG fuel tanks are approved by the US Department of Transportation and are much safer than traditional fuel tanks.
- CNG tanks are able to:
 - Survive a drop from an 8-story building
 - Resist the blast caused by a full stick of TNT
 - Survive a 1,500F degree fire
- Natural gas is lighter than air. When released it dissipates into the atmosphere, quickly moving up and away from its source.
- Natural gas has an ignition temperature that is 2 times higher than that of motor gasoline and a narrow range of flammability.

CNG is Economical

Despite lower gas and diesel prices, CNG provides a compelling return on investment to fleet operators:

- **Savings potential of \$1.00 - \$1.50 per gallon versus diesel.**
- Elimination of DEF and DPF expenses.
- Delaware Clean Vehicle Rebate Program:
 - Up to \$1,500 for light- and medium-duty NGVs
 - **\$20,000 for Heavy-Duty Dedicated NGVs**
- Delaware Infrastructure Grants – Returning soon?
 - Up to \$500K for CNG refueling infrastructure – public or private.
- <http://dnrec.alpha.delaware.gov/energy-climate/clean-transportation/>

The Price Gap Between CNG and Diesel is Expected to Widen:



Source: US Energy Information Administration

CNG is Cleaner

“Heavy Duty Vehicles (HDVs) represent 7% of all vehicles on US roads, yet they account for about 50% of all smog-precursor emissions and 20% of all transportation-related GHGs.”

- NGVAmerica

CNG can provide:

- Up to 20% Reduction in GHG Emission (40%+ with RNG)
- Near Zero NOx and SOx Emissions.

Natural Gas	Diesel	Electric
\$27 per lb of NOx	\$58 per lb of NOx	\$51 per lb of NOx
\$150,000 Technology Cost	\$100,000 Technology Cost	\$290,000 Technology Cost
5,582 NOx reduced	1,716 NOx reduced	5,715 NOx reduced

Source: NGVAmerica

CNG is Available

CNG vehicle fueling stations continue to rise in the US, with stations now available on most highways and interstates.

- **Plan your route:**
www.ngvamerical.org
- **1,680 Stations and 50 planned**



CNG: Longer Vehicle Lifespan & Lower Maintenance Costs:

City of Tyler, Texas began switching its refuse fleet to CNG in 2012:

“The city spends about \$40,000 each year for maintenance on a diesel truck, and about \$13,000 a year on a CNG powered truck. The oil is clean when it is changed on a CNG truck”

Russ Jackson, Solid Waste Vehicle
Services Manager



Source: <http://www.tylerpaper.com> “Tyler’s Compressed Natural Gas Garbage Trucks make their rounds quietly.”

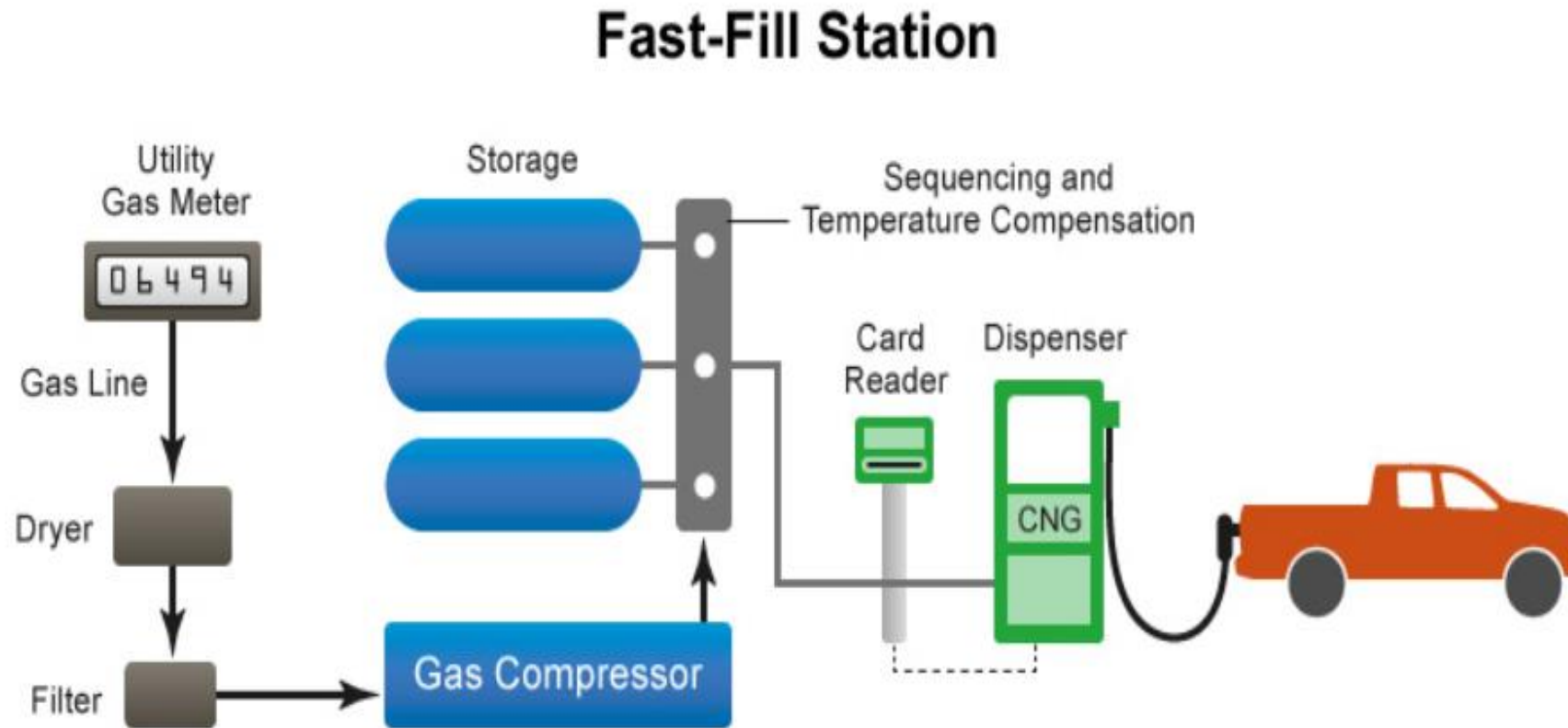
CNG is Widely used by Freight Fleets:



How is CNG Produced?



Fast Fill vs. Time Fill



Fast Fill Considerations

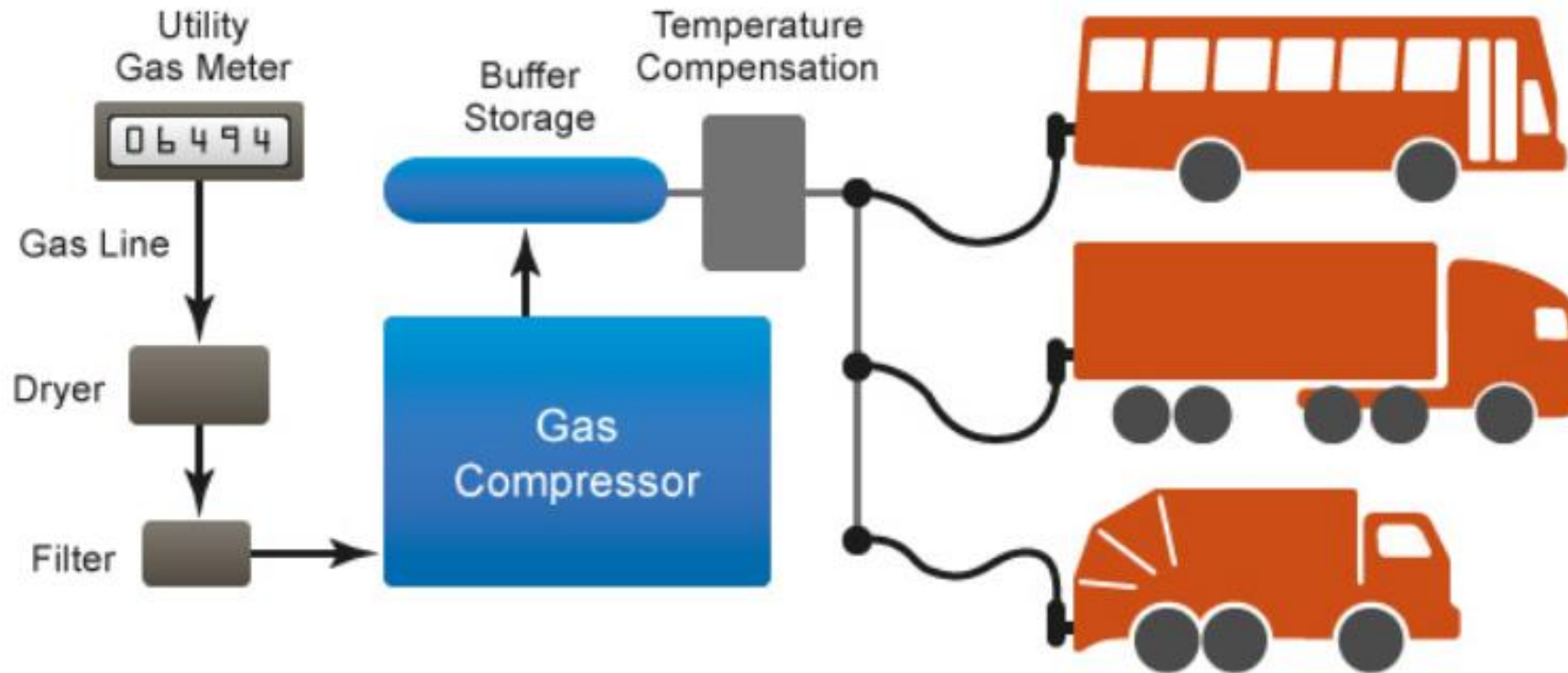
- Convenient, 24-hour access. Supports random fill-times.
- Able to “top-off” a vehicle.
- Large Compressors and storage vessels
- Fill rates comparable to gasoline.
- Dispensers equipped with card-readers for a familiar retail experience.
- Higher CAPEX for design and construction – longer paybacks.
- Less savings per gallon.
- Current average retail CNG price in Mid-Atlantic is ~\$2.25 per gal.



Chesapeake CNG Station - Energy Lane, Dover, DE

Fast Fill vs. Time Fill

Time-Fill Station



Time-Fill Considerations

- Ideal for fleets that are housed at a central location.
- Fill parked vehicles overnight when not in use.
- No time lost to refueling.
- Smaller compressors and minimal or no storage.
- Much lower CAPEX solution.
- Can be modified for some fast-fill capacity.
- Current savings potential of \$1.00 - \$1.50 per gallon vs. diesel.
- Lower cost per gallon = shorter payback.



Waste Management – overnight refueling

Natural Gas Vehicles (NGV)

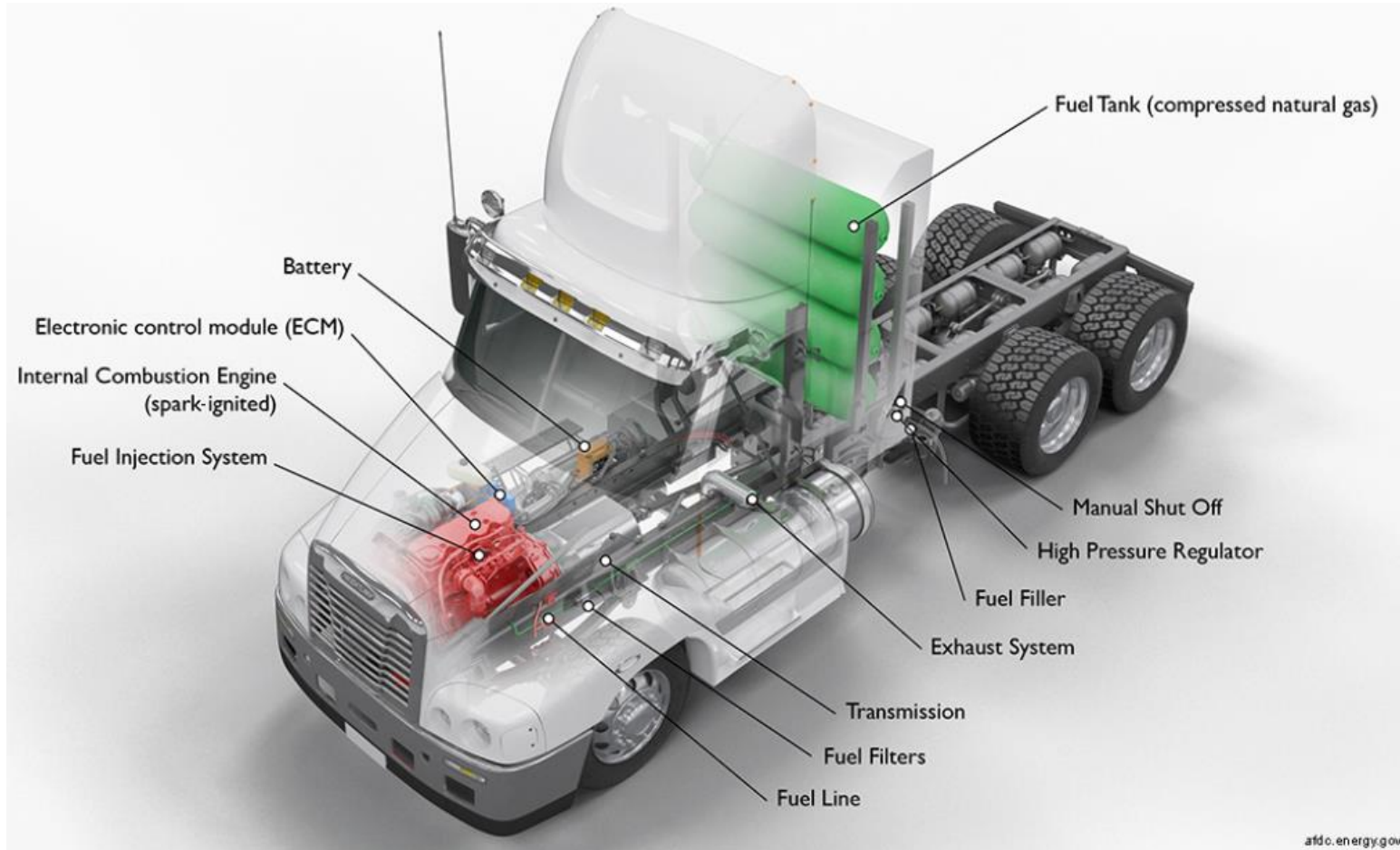


Three Types of NGVs

- **Dedicated** – A vehicle that only runs on CNG. Great choice for vehicles with predictable routes.
- **Bi-Fuel** – Vehicles that can switch between gasoline and CNG. Most common conversion for light- and medium-duty.
- **Dual Fuel** – Less Common. Vehicle blends CNG with diesel by injecting it into the turbocharger. Vehicle will use up to 50% CNG, but can run on only diesel.



Anatomy of a Class-8 NGV



Natural Gas Engines

Factory Installed by Every
Class 8 Truck Manufacturer



Near-Zero Emissions

Cummins-Westport L9N and ISX12N

- 9 Liter, 320 HP, 6-Cylinder
- 12 Liter, 400 HP, 6-Cylinder
- **Exceed Current EPA NOx emissions standard by 90% (0.02g/bhp-hr)**
- Simple Three-way Catalyst Exhaust After-treatment.
- NO SCR, No DPF.
- 2-year, 250,000 mile warranty



CNG Tanks – Four Types:

Type 1 – Heavy, all steel construction.



Type 2 – Steel tank, center wrapped with composite. 25% lighter than Type 1.



Type 3 – Aluminum liner with composite shell. Significant weight savings.



Type 4 – Polyethylene liner with composite shell. Lightest of all Types.



Regional CNG/NGV Initiatives

- Major Adopters in PA, MD, NJ:
 - Waste Haulers
 - Ready Mix Concrete
 - Dump trucks
 - Beverage Distribution
 - Parcel delivery
 - Utility fleets
 - Regional tractor-trailers
- Incentives – infrastructure grants, vehicle vouchers, compression tariffs, tax credits
- **VW settlement funds?**



LJ Verrastro Beer Distributor – Eastern PA

CNG Success Story in Delaware

Waste Management

- New facility in Laurel, DE
- 45 CNG-powered waste trucks
- Annual diesel offset is 400,000 gallons.
- 20% reduction in CO2 emissions – about 2.3 million pounds of per year.



Challenges to Greater CNG Adoption

- **Infrastructure Cost**
- **Public station availability**
- **Range anxiety**
- **Vehicle Investment**
- **Maintenance Facility Upgrades**
- **Low Gasoline and Diesel prices**
- **Grant Funding and Rebate Availability**



Freight CNG Opportunities on Delmarva

- **Local Fleets**

- Private Waste Haulers
- Municipal Waste Haulers
- Beverage Distributors
- Warehousing/Logistics
- Ready-Mix Concrete
- Asphalt and Aggregate Haulers
- Parcel Delivery
- Poultry Industry
- DelDOT, DART

- **Transients on the Route 1 and 113 Corridors from Virginia to PA and NY**
- **CNG Facilitates the purchase of Renewable Natural Gas (RNG) which can only develop after CNG is deployed.**
- **The Natural Gas Grid is ready for NGVs TODAY.**

Thank you!

Questions?

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& Pre-Customer Integration

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